

Clemson IMPACTS

Clemson University Public Service Activities

Spring 2008



Turning trees
into fuel



School district
partnership
helps build
strong
communities



Beach vitex
may be on last
legs in S.C.



Leaner meats
can lead to
better health
and lower costs



New
partnership
forms to
rejuvenate
teachers and
students



Finding ways
to repair
hearing loss
in babies and
seniors



Letter from the Vice President

As the price of oil continues to rise, Clemson scientists are exploring alternative fuels that can be produced in South Carolina. Alternative sources being studied include agricultural waste and trees grown especially for fuel. Other scientists are investigating ways to improve early strawberry production and are sharing management systems to boost profitability for cattlemen.

Social science research is being put into practice to build strong communities that provide a safe and supportive environment for children. This model program brings together community members from all sectors – schools, civic groups, churches, health care and business – with the goal of protecting and nurturing our most precious resource: children.

Environmental research is discovering that oysters can produce high-tech coatings that protect metals from corrosion and reduce resistance. Other research is restoring “brownfields” – areas that have been polluted by chemicals. In addition to the science, a team approach and long-term vision are needed to restore or prevent damage to the environment.

Food scientists are finding that poultry processors can reduce water usage by using chilled air instead of water to prevent food-borne bacteria. Other research is investigating ways to reduce the fat content in beef cattle as a means to reduce fat in human diets.

A remarkable partnership with the S.C. Department of Education, private donors and Clemson has set a goal of developing a national-model for nature-based education programs for both teachers and students. The first programs will be implemented this summer with more to be offered in the future.

Sincerely,

John W. Kelly

Vice President for Public Service and Agriculture

Knowledge for living. Knowledge for life.

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PUBLIC SERVICE

Clemson Impacts, a quarterly publication of Clemson Public Service Activities, is available to South Carolina residents upon request. *Clemson Impacts* is also available on the web www.clemson.edu/public/

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Turning TREES into FUEL

By Peter Kent

As demand for oil increases, the search for alternative fuels becomes a top priority. Researchers are studying grasses and trees as sustainable resources to produce ethanol. Fast-growing poplar trees hold much potential as a fuel-stock but require costly pretreatment prior to processing for ethanol.

Cellulose is the plant material used to make ethanol. Another plant material, called lignin, impedes processing into fuel. Molecular biologist Haiying Liang is seeking to breed poplars with modified lignin structure that could facilitate bio-fuel production and be less costly to process without harming the tree's growth.

She is growing test trees now in the Clemson greenhouses. Her results could lead to increased bio-fuel production within the next decade.

For more information: Haiying Liang, 864-656-2414, hliang@clemson.edu or <http://people.clemson.edu/~hliang/>.

Photo courtesy Purdue University

Recycled agricultural waste generates biofuel

By Peter Kent

Recycling waste products is environmentally and economically vital for the state, nation and world. Santee Cooper and Clemson's S.C. Institute for Energy Studies are partnering on a farm-to-fuel demonstration project that will convert swine waste, crop residue and energy crops into biogas to generate electricity.

"If agricultural waste and crops are to be used successfully as a significant source of electricity, we need a model that will generate large quantities of electricity at reasonable prices," said Robert Leitner, director of the Institute for Energy Studies.

"This project also has the potential to stimulate the economy in agricultural regions throughout the state, and its design will address other common agriculture waste streams in South Carolina, such as poultry litter and dairy manure. It's a winner all the way around."

For more information: Robert Leitner, 864-656-2267, leitne@clemson.edu.



Photo by Laura Hedden

Colored nets may boost strawberry yields

By Tom Lollis

Light manipulation with colored nets may give South Carolina strawberry producers a boost in yields. Bob Dufault, horticulturist at the Coastal Research and Education Center, is using red, yellow and pearl colored nets to see if they improve performance of forced fall/winter strawberries.

Developed by Israeli scientists, the yellow nets increase vegetative growth in some plants. Pearl nets increase branching, and red nets increase both vegetation and fruiting. This is the first time the nets have been used with strawberries.

Strawberries were planted in early September and berries harvested from Halloween until late February. Results to date do not show a great increase in yield for the fall and winter berries, but do indicate an improvement in plants for spring production, starting in late March.

"Netting may be more effective from February to April instead of during the fall," Dufault said. He will do a budget analysis after spring harvest to see if the nets are profitable before recommending their use.

For more information: Bob Dufault, 843-402-5389, bdflt@clemson.edu.



Photo by Tom Lollis

Ag Lenders School helps farmers, too

By Tom Lollis

For 25 years the annual Southeastern Agricultural Lenders School hosted by Clemson has helped farmers in South Carolina and throughout the Southeast find reliable access to credit.

"This program educates lenders on the agricultural economy, which helps them make good loan decisions, and that helps all farmers have better access to credit at a lower interest rate," said Johnny Jordan, executive director of the school.

"Bad loans cost everyone and increase interest rates. A bad loan could also put the farmer out of business," he said. More than 600 lenders have attended the Lenders School since its inception.

This year's program included more than 30 hours of instruction on management evaluation, the 2008 Farm Bill and economic outlook, trends in ag lending and real estate investments, and credit analysis tools.

For more information: Scott Mickey, 803-775-4580; cscfma1@ftc-i.net.



Photo by Tom Lollis

Beef Cattle Marketing School improves profits

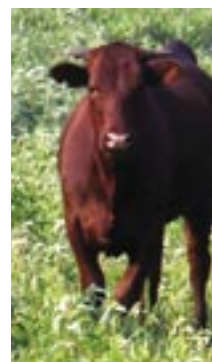
By Tom Lollis

Cattlemen learned how to improve profits in Southeast Beef Cattle Marketing School sessions held this spring in Gaffney and Marion.

Topics included how to develop a marketing plan, predict a cash price, add value to a calf crop and develop marketing alternatives.

The program, coordinated by Brian Beer, Clemson Extension area livestock agent, was a cooperative effort by Clemson University, the University of Georgia, Auburn University and the University of Florida. It was sponsored by the Southern Region Risk Management Education Center.

For more information: Brian Beer, (803) 283-3302, ext. 115; bbeer@clemson.edu.



Farmers get advice on soybean supply

By Tom Lollis

Soybean growers face a shortage of seed for the 2008 season because of severe drought in 2007. Preferred varieties may be in limited quantities or not available.

Pawel Wiatrak, Clemson University soybean agronomist at Edisto Research and Education Center, advised growers to buy seed as soon as possible and to decrease seeding rates.

His research on planting dates and maturity groups has shown that growers can reduce rates from about 110,000 to 55,000 seeds per acre without significant yield reduction. This will help growers to extend planted acres and reduce the cost of seeds per acre.

For more information: www.clemson.edu/edisto/soybeans/ or Pawel Wiatrak, 803-284-3343, ext. 261; pwiatra@clemson.edu.

Honey bees are vital to our food supply

By Diane Palmer

The honey bee industry has been dealt a heavy blow due to colony collapse disorder in which worker bees abruptly disappear. The causes are unknown, but researchers are now beginning to narrow their focus on a few possible causes related to environmental stresses, including pesticides, mites, disease and malnutrition.

South Carolina bee colonies have been luckier than most but are not immune to the condition. The bees pollinate apple, cantaloupe, cucumber, squash and watermelon crops worth an estimated \$24 million in the state.

"About 2,000 beekeepers manage around 25,000 honey bee colonies in South Carolina, and interest in beekeeping is at an all time high," said Mike Hood, Clemson bee specialist.

More than 240 new beekeepers are enrolled in introductory courses he teaches through the Master Beekeeper program coordinated by Clemson Extension and the S.C. Beekeepers Association.

For more information: Mike Hood, 864-656-0346, mhood@clemson.edu.



Photo by Diane Palmer

Community Fellows take volunteering to a new level

By Kerry Coffey

A dedicated group of volunteers is embarking on year-long projects to extend the vision of Strong Communities. This initiative to prevent child abuse and neglect serves families in southern Greenville County and adjacent areas of Anderson and Laurens counties.

The 26 volunteers, called Clemson Community Fellows, are organized into two groups. David Taylor, pastor of Eastminster Presbyterian Church in Simpsonville, leads one group and Michael Wolfe, pastor of Augusta Road United Methodist Church in Pelzer, leads the other.

"In these times of uncertainty and risk, it is easy to retreat into looking out for 'me and mine,' but that attitude deprives 'me and mine' of the richness of broader community connections," David Taylor said. "I feel that I need the community as much as the community needs me."

Projects include a community book project to celebrate volunteerism and increase community engagement and a project to increase family participation in parent/child activity centers.

For more information: Strong Communities, 864-688-2214, or www.clemson.edu/strongcommunities.



Photo by Kerry Coffey

School district partnership helps build strong communities

By Kerry Coffey

Almost 400 volunteers and more than 125 families are participating in the Strong Communities initiative to support families with young children through Anderson County School District 1.

Developed by Clemson's Institute on Family and Neighborhood Life, the initiative seeks to prevent child abuse and neglect by providing families with a community-based support network to help them cope with the challenges of raising young children.

Doris Cole, research assistant professor at the Institute, was responsible for recruiting the volunteers and families through the school district. She helped renovate the Williamston Action Community Center to provide a family support center and a hub for family activities.

"Dr. Cole has been instrumental in forming a partnership between Strong Communities and the Anderson School District 1 board," said Superintendent Dr. Wayne Fowler. "This partnership has resulted in more families in the community having a connection to someone who can help them." Because of her work, Cole received the Rural Educator of the Year award from the S.C. Department of Commerce.

For more information: Strong Communities, 864-688-2214, or www.clemson.edu/strongcommunities.



Photo courtesy Dept. of Commerce

Compassion Project helps rural citizens

By Kerry Coffey

Since 2002, rural faith-based and community groups have been able to help the state's underserved citizens through the South Carolina Rural Communities Compassion Project.

The program is administered by Clemson's Institute on Family and Neighborhood Life and funded by the U.S. Administration on Children and Families. The federal grants have helped support efforts by 121 groups across the state to address homelessness, at-risk youth, children of prisoners and other issues.

The next phase of the project will partner with The Spartanburg County Foundation and Sisters of Charity Foundation of South Carolina to distribute mini-grants up to \$20,000 that will build the capacity of rural organizations. In addition, technical assistance is provided through workshops and consulting on topics from board development to financial management.

"The opportunity to provide so much funding and assistance to organizations serving rural South Carolina's most vulnerable populations is unique among universities and a great tribute to Clemson's commitment to public service" says Mark Small, director of the project.

For more information: Clemson Institute on Family and Neighborhood Life, 864-656-6271, or www.clemson.edu/ifnl.

Is it really a brown recluse?

By Diane Palmer



Photo courtesy IPM images

The brown recluse spider may be getting more credit than deserved for putting the bite on South Carolina residents. The number of skin lesions diagnosed as brown recluse bites is far greater than the number of spiders that have been collected.

"It is difficult for a physician to diagnose a brown recluse bite based simply on an examination of the wound," said Clemson entomologist Ian Stocks. He worked with Ivar Frithsen of the Medical University of South Carolina and Richard Vetter of the University of California at Riverside to analyze spider bite diagnosis data collected from physicians in the state.

They found that, in many cases, if a patient did not remember getting an injury they assumed it was a spider bite. In fact, many times the wound was caused by bacteria called MRSA (methicillin resistant *Staphylococcus aureus*), which has become a significant health problem in parts of South Carolina. Their study was published in the *Journal of the American Board of Family Medicine*.

For more information: Ian Stocks, 864-656-5058, ians@clemson.edu, or www.jabfm.org/.

Oysters provide key to super-tough coatings for metals

By Peter Kent

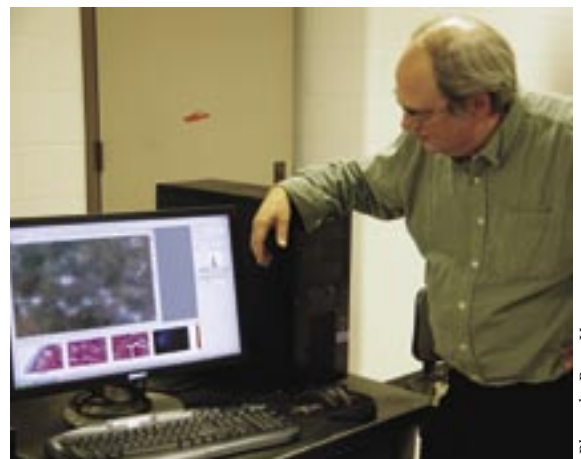
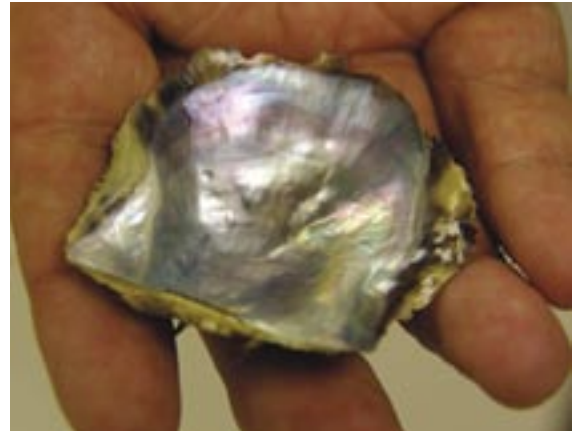
The military and industry need ways to protect equipment in harsh environments. A Clemson scientist has had success in manipulating oyster blood cells to deposit nacre, the material used to form shell and pearl, on to aluminum, titanium and stainless-steel alloy surfaces. This research holds promise to create super-tough coatings that will resist corrosion and reduce drag.

Marine biologist Andrew Mount determined that oyster hemocytes blood cells are responsible for shell and pearl formation. His findings led to an experiment to test whether or not oyster blood cells removed from the animal would trigger nacre deposition. The results were exciting.

"We saw oyster blood cells acting like they do when they grow shell, but they were growing on metal," said Mount. "This opens up a new realm for coatings and for growing structures that would be very hard and very tough in harsh environments and be lightweight at the same time."

Mount's research is already attracting attention from U.S. Air Force and industry.

For more information: Andrew Mount, 864-656-3597, mount@clemson.edu.



Photos by Peter Kent



Photo by Newt Hardie

Kudzu SWAT team removes weed without chemicals

By Diane Palmer

Kudzu kills trees, damages property and is unsightly. Most believe the only way to eliminate this invasive plant is with herbicides. But the Kudzu Coalition, a group of 100 volunteers in Spartanburg, has learned effective methods to control the plant without chemicals.

Master Gardeners are part of this coalition. Clemson Extension agents provide extensive horticulture training before they begin their volunteer work. Their latest project was to remove kudzu overgrowth on a 23-acre site in the Sumter National Forest at the Sedalia Seasonal Camp.

They killed 90 to 95% of the kudzu – roughly 3,200 plants – by tracing each vine back to the crown and chopping it off.

"Non-herbicide methods might become a standard treatment," said Newt Hardie, president of the Kudzu Coalition.

For more information: Corey Tanner, 864-596-2993, shannt@clemson.edu or www.kokudzu.com.



Photo by Tom Lollis

Beach vitex may be on last legs in S.C.

By Tom Lollis

Beach vitex, also known as beach kudzu, may be on its last legs as a threat to native dune plants and sea turtle hatchlings on the South Carolina coast, thanks to the Carolinas Beach Vitex Task Force and Clemson scientists.

Betsy Brabson, a Georgetown County resident and now coordinator of the task force, reported vitex in 2003 to scientists at Clemson's Baruch Institute for Coastal Ecology and Forest Science. Chuck Gresham, Clemson forestry ecologist, developed control measures that have cleared 96 vitex sites to date and are expected to clear another 92 sites this year using the herbicide Habitat®.

"Vitex could be virtually eliminated in South Carolina by the end of 2009," said Jack Whetstone, Sea Grant Extension Program specialist at Baruch. The task force won the 2007 Pulling Together Initiative Community Spirit Award from the National Fish and Wildlife Foundation for its efforts to eradicate the plant.

For more information: Jack Whetstone, 843-546-6321; jwhtstn@clemson.edu.

Lexington County officials tackle stormwater issues

By Tom Lollis

Local government officials in Lexington County and its municipalities joined forces with Clemson's Carolina Clear program to tackle stormwater issues on a countywide basis.

"Stormwater runoff is becoming more of an issue as development replaces natural buffers and filters with rooftops, parking lots, driveways and roads," said Billy Derrick, chairman of Lexington County Council.

Keeping streams, rivers and basins as clean as possible is a public health and safety issue, since most streams in the area run into Lake Murray, the reservoir for drinking water for the cities of Lexington, Cayce, Irmo and West Columbia, and surrounding rural areas.

"The goal of Carolina Clear and the Lexington County Stormwater Consortium is to minimize polluted stormwater runoff by educating the public, builders, contractors, developers and government officials," said Cal Sawyer, Clemson Extension water quality coordinator.

For more information: Bill Blackston, 803-359-8515, ext. 116, wblckston@clemson.edu or Cal Sawyer, 864-656-4072, calvins@clemson.edu.

Restoration ecologists seek to protect the environment

By Sonya Albury-Crandall

Restoration activities have traditionally focused on improving or rehabilitating natural habitats in parks and conservation areas. Today, there is an emerging emphasis on brownfields, cleaning up polluted areas, and addressing overuse of natural landscapes.

In March, Clemson's Restoration Institute hosted the annual symposium for the Society for Ecological Restoration Coastal Plain chapter. Presentations focused on ways to initiate new restoration projects and to prevent environmental degradation through dialog with community members and developers. Clemson scientists presented methods to restore degraded habitats by improving indigenous vegetation and attracting wildlife.

Gene Eidson, Clemson restoration ecology director, said, "A team approach and long term vision can be very effective in protecting local habitats and restoring biochemically damaged areas."

For more information: Gene Eidson, 864-656-2618, geidson@clemson.edu or www.clemson.edu/restoration/ecology/.



Photo by Peter Kent

Concerned about water issues in South Carolina? Join the discussion!

S.C. Water Resources Conference • October 14-15, 2008 • Charleston Area Convention Center

For more information: Jon Van Bergen, 864-656-2618, SCwaterconference@gmail.com or www.clemson.edu/restoration/ecology/.

Teaching chefs to fight the battle of the bulge

By Peter Kent

For many South Carolinians, healthy eating is more than a choice: it's a necessity to control weight, blood pressure and cholesterol. More and more of us dine out; and to help fight the "battle of bulge" chefs are learning new ways to reduce portions and enhance nutrition and flavor.

Clemson food scientist Margaret Condrasky is working with the American Culinary Federation to give chefs a refresher course in health and wellness, using new agricultural products and science-based culinary techniques. This year alone, she has taught the new methods to more than 200 chefs. The results are menu choices that not only taste good but are good for you.

For more information: Margaret Condrasky, 864-656-6554, mcondra@clemson.edu.



Photo courtesy American Culinary Federation

Leaner meats can lead to better health and lower costs

By Peter Kent

Obesity has become a high-priority health hazard. Animal biology researchers are seeking ways to control fat in food animals. Leaner meats may not be the only benefit. New production methods can improve farm efficiency, keeping costs down for the farmer and consumer.

Food animal researcher Susan Duckett is examining fat cells in livestock. She is looking at how animals gain fat and what can be done to minimize fatty tissue. Duckett's research includes identifying the genes and proteins that signal the development of fat cells and fatty acids.

Her work could become the basis for new production methods that would increase the health value of meats and help livestock producers improve the feed-to-food ratio for their cattle.

For more information: Susan Duckett, 864-656-5151, sducket@clemson.edu or <http://people.clemson.edu/~sducket/>.



Photo by Peter Kent

Air-chilling poultry can reduce water use in processing plants

By Diane Palmer

About nine billion chickens are processed in the United States each year and 63 billion gallons of water are used to cool them when they are immersed in cold water or an ice and water mixture.

The USDA Food Safety and Inspection Service requires commercial processing plants to chill poultry to an internal temperature of at least 40° F immediately after slaughter to prevent development of bacteria.

Julie Northcutt, Clemson food safety specialist, has been working on a way to chill the birds using air instead of water. "Air chilling would reduce water usage by as much as a gallon per bird and water conservation is critical for the future of the poultry industry," she said.

There are two ways to air chill. One is dry air chilling, which sends a cold air blast inside or across the bird. The other is evaporative air chilling, which uses a cold air blast and water-mist combination.

For more information: Julie Northcutt, 864-656-3688, jknorth@clemson.edu.

A generous gift and a remarkable partnership are developing a renewal center for teachers, a wilderness camp for teens and an environmental field-study program for children... all in the beautiful Jocassee Gorges area.

New partnership forms to rejuvenate teachers and students

By Chris Copeland

More than 6,800 teachers in South Carolina will not return to schools where they taught last year; and one-third of new teachers leave the profession within three years. A new partnership seeks to change these statistics and set a national standard for education.

The Cliffs Communities and its foundations are donating \$10 million and more than 355 acres of land in the Jocassee Gorges area to support development of a Teacher Renewal Center that will be jointly operated by Clemson's Youth Learning Institute and the S.C. Department of Education.

"We are honored to be a part of a project that will make a tremendous difference in the lives of thousands of teachers and children in South Carolina," said Jim Anthony, founder and chief executive officer of The Cliffs.

State Superintendent of Education Jim Rex said, "The scope of this takes your breath away. It's such an amazing show of support for our children, for our schools and for our state. Now we have to honor Mr. Anthony's support by building something that will become the gold standard for the whole nation."

The center will include residential and conference facilities where teams of teachers can attend weeklong programs to enhance collaborative inquiry and continuous improvement in schools, and to heighten awareness of personal health and wellness. It also will incorporate experiential learning programs for students while teachers participate in seminars.

"Our goal is nothing less than creating the nation's premier teacher center and developing a national model for nature-based education programs," said Clemson President James Barker.

"This partnership allows the Youth Learning Institute to expand our programs for youth and educators into new areas," said Jorge Calzadilla, executive director. "We are humbled to be the stewards of a gift that will impact education for generations to come."

For more information: Stephen Lance, 803-414-1735, slance@clemson.edu.



Photo courtesy Youth Learning Institute

Environmental field-study program expands to Upstate

By Chris Copeland

As early as second and third grade, children learn about the earth's environmental problems. They can explain the demise of rainforests, the plight of endangered species and the damage of oil spills.

Clemson's Youth Learning Institute agrees with author David Sobel that "if we want children to flourish, we need to give them time to connect with nature and love the Earth before we ask them to save it."

Since 1991, the Institute has reached more than 70,000 teachers and students through Teaching Kids About The Environment (KATE) programs at Camp Bob Cooper in Summerton. Now, a gift of forestland by The Cliffs Communities and its foundations will enable the program to expand to the Upstate.

During the three-day/two-night adventure, third through fifth graders are exposed to more core outdoor education than they experience in three weeks of traditional classroom instruction. The program was developed by the Youth Learning Institute and the S.C. Coalition for Natural Resources. It utilizes science-based curriculum that covers water ecology, wildlife resources, forestry and soil science, and is endorsed by the S.C. Department of Education.

For more information: Greg Linke, 864-353-4313, glinke@clemson.edu or www.clemson.edu/yli/teachingkate/.



4-H celebrates 100 YEARS and seeks alumni

By Diane Palmer

Millions of young people have been involved in 4-H since the first corn club in 1908. For the 100th anniversary, state 4-H is asking everyone who has ever been a 4-H member to contact their county's Clemson Extension office so they can be included in centennial celebrations.

Many Extension offices will be hosting alumni events and a statewide alumni luncheon is planned during State 4-H Congress in July on the Clemson University campus.

The 4-H volunteer network includes more than 3,500 adult and 750 youth volunteers in South Carolina. Marty Richey of Honea Path was recognized as an outstanding volunteer.

He has organized two 4-H clubs in Anderson County that are involved in multiple projects. He and his wife, Chris, raised the money and took the 4-H'ers to the shooting sports nationals in Bowling Green, Kentucky.

"We chose clubs where children can participate who wouldn't ordinarily get to," he said. "We left no child behind, regardless of their circumstances."

Kathy Wright, Clemson Extension 4-H agent in Anderson County, said, "He's an all around great volunteer and if we could make a mold of him, we would."

For more information: Amy McCune, 864-656-6651, amccune@clemson.edu, www.clemson.edu/4h/.



Photo by Marty Richey

New wilderness adventure camp connects kids with nature

By Chris Copeland

A disconnect with nature among today's youth is linked to childhood disorders like obesity, ADHD and depression. Author Richard Louv calls it "nature-deficit disorder" in *Last Child in the Woods*, a book that has spurred national dialogue among those concerned about the health and well-being of children.

In response, Clemson's Youth Learning Institute is introducing Adventure Summer Camp, a 10-day wilderness excursion in the Upstate for youth ages 12 to 15. Backpacking, canoeing, mountain biking and workshops on wilderness safety and survival skills will help youth cultivate responsibility, self-confidence and teamwork.

"Connecting kids with nature is important for healthy youth development. This is a great adventure that teaches skills and encourages kids to continue pursuing outdoor activities," said Brett Deming, adventure programming director at the Institute.

The camp will be located at Pinnacle Falls, a 100-acre camp donated by The Cliffs Communities and its foundations. The site features a trout stream, 60-foot waterfall, game field and hiking trails, with access to the 76-mile Foothills Trail and Lake Jocassee.

For more information: Brett Deming, 864-878-1041, bdeming@clemson.edu or www.clemson.edu/yli/adventurecamp/.



Photo by Youth Learning Institute

Nurturing the next generation of scientists

By Peter Kent

Science can enrich the lives and livelihoods of South Carolinians. More and more jobs require scientific and technical know-how and all citizens need some science knowledge to understand how the world is changing.

To support science education, Clemson hosted the 2008 S.C. Academy of Science annual meeting in March, bringing together more than 600 high school students, undergraduates, research scientists and teachers. The event provided an opportunity for students to display research posters and present papers on their work. Teachers earned recertification credits through workshops on DNA and biofuels.

"Science faces an unprecedented challenge to understand our changing world and to apply research that can reduce our impact on the earth," said David Gangemi, incoming academy president and Clemson faculty member. "Clemson's support for the academy arises from a deep commitment to stimulate the creative abilities of South Carolina students and to provide learning opportunities to develop their talents."

For more information: Marge Putnam, 864-656-3015, marge@clemson.edu.



Photo by Pat Wright

Research studies aid forested wetlands managers

By Tom Lollis

A new book provides information on tidal freshwater forested wetlands for natural-resource managers, scientists and students interested in the complex dynamics of the coastal ecosystem.

The 518-page book – "Ecology of Tidal Freshwater Forested Wetlands of the Southeastern United States" – compiles up-to-date findings about the hydrology, biochemistry, community ecology, forestry, stress physiology, and restoration of tidal freshwater forested wetlands. This fragile ecosystem is sensitive to sea-level rise and increased frequency of drought or flood.

The information comes from case studies from North Carolina, South Carolina, Georgia, Florida and Louisiana contributed by 17 scientists in the U.S. Geological Survey's Global Change Research Program.

Will Conner, ecologist at Clemson's Baruch Institute of Coastal Ecology and Forest Science, edited the book with Thomas Doyle and Ken Krauss at the U.S. Geological Survey National Wetlands Research Center in Lafayette, La.

For more information: Will Conner, 843-546-6323, wconner@clemson.edu.



Finding ways to repair hearing loss in babies and seniors

By Peter Kent

About three in 1,000 babies are born with hearing impairments, making it the most common birth defect. And one in three older adults will have hearing problems.

Clemson neuroscientist Susan Chapman is studying the development of the middle ear to understand the causes – and seek possible solutions – for these conditions. Her research may one day help scientists and medical experts identify and repair hearing defects while a child is still in the womb and help seniors later in life.

Chapman is seeking to unlock a puzzle: How do cells in an embryo develop into the complex structure of the ear?

Studying chicken embryos, she is looking at where the cells that create the middle ear come from and what genetic signals these cells receive to build the structures. Understanding how to trigger the cells can lead to cellular repair in the future.

For more information: Susan Chapman, 864-656-3057, schapm2@clemson.edu.



Photo by Peter Kent



Photo by Peter Kent

Helping fruit trees cope with global warming

By Peter Kent

Climate change and global warming will affect our food supply. South Carolina is the No. 2 peach-producer in the nation and growers are concerned. Many fruit and nut trees need sufficient chilling hours to make fruit, and the trees also need to be hardy enough to withstand a late frost.

Douglas Bielenberg, a Clemson plant physiologist, examines dormancy and chilling. Focusing on peach trees, his research could help breeders and growers develop trees better attuned to the local winter environment. He is studying the genetic and cellular signals that begin dormancy and the developmental events involved in bud formation and non-growth seasonal phases.

"Looking at ways to alter the number of chilling hours a plant such as the peach tree needs can mean the difference between where we can grow fruit and nut crops," said Bielenberg.

In California, warmer temperatures could mean fewer chilling hours and the change could affect as many as 18 varieties of fruits and nuts. Agriculture experts theorize that climate change could have similar effects in South Carolina.

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